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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,948	11/14/2003	James N. Pan	50432-655	7419

7590 11/14/2005
McDERMOTT, WILL & EMERY
600 13th Street, N.W.
Washington, DC 20005-3096

EXAMINER

PERALTA, GINETTE

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 11/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/706,948

Applicant(s)

PAN ET AL.

Examiner

Ginette Peralta

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 1-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14 and 15 is/are rejected.
- 7) ☒ Claim(s) 16-21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/14/05
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 14-21 in the reply filed on 7/28/05 is acknowledged.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 14 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim et al. (US Pat. Pub. 2004/0063286 A1).

Regarding claim 14, Kim et al. discloses in Figs.3A to 3R a method of forming a multiple-channel semiconductor device that comprises the steps of forming a stack on the substrate, the stack including at least two lightly doped channel regions 16 vertically separated from each other and from the substrate by insulator layers 14, and a gate electrode 48 separated from the channel regions 16 by an insulator layer 14; forming an oxide liner 46 (shown in Fig. 3O-3R) on sidewalls of the gate electrode 48; forming source and drain regions 32 contacting

sidewalls of the channel regions; and forming gate electrode spacers 40 on the oxide liner 46 on the gate electrode 48.

Regarding claim 15, Kim et al. discloses that the step of forming an oxide liner includes forming a thermal oxide liner 46 on the sidewalls of the gate electrode 48, as shown in Fig. 3O.

Allowable Subject Matter

4. Claims 16-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The primary reason for the allowance of the claims is the inclusion of the feature of forming gate electrode spacers on the oxide liner by depositing nitride on the oxide liner and the gate electrode and performing a spacer etch stopping on the insulator layer separating the gate electrode from the channel regions in combination with forming a multiple channel semiconductor device by the steps of forming a stack on a substrate that includes at least two lightly doped channel regions and a gate electrode, forming an oxide liner on the sidewalls of the gate electrode; and forming source and drain regions contacting sidewalls of the channel regions which is not anticipated nor rendered obvious over the prior art of record. The prior art of record includes Kim et al. as discussed above and Krivokapic (U. S. Pat. 6,919,250 B2), where Krivokapic discloses a method of forming a semiconductor device that includes forming a stack of alternating

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semiconductor and insulating material, forming an oxide liner on sidewalls of the gate electrode; and forming source and drain regions contacting sidewalls of the semiconductor regions, but does not include forming multiple channels or forming gate electrode spacers on the oxide liner that stop on the insulator layer separating the gate electrode from the channel regions as disclosed in claim 16, and subsequent claims that depend from claim 16.

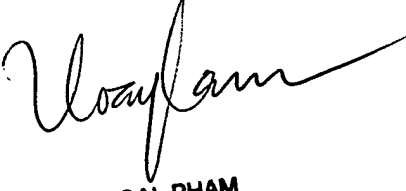
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ginette Peralta whose telephone number is (571) 272-1713. The examiner can normally be reached on Monday to Friday 8:00 AM- 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GP



HOAI PHAM
PRIMARY EXAMINER